

The Divine Measure

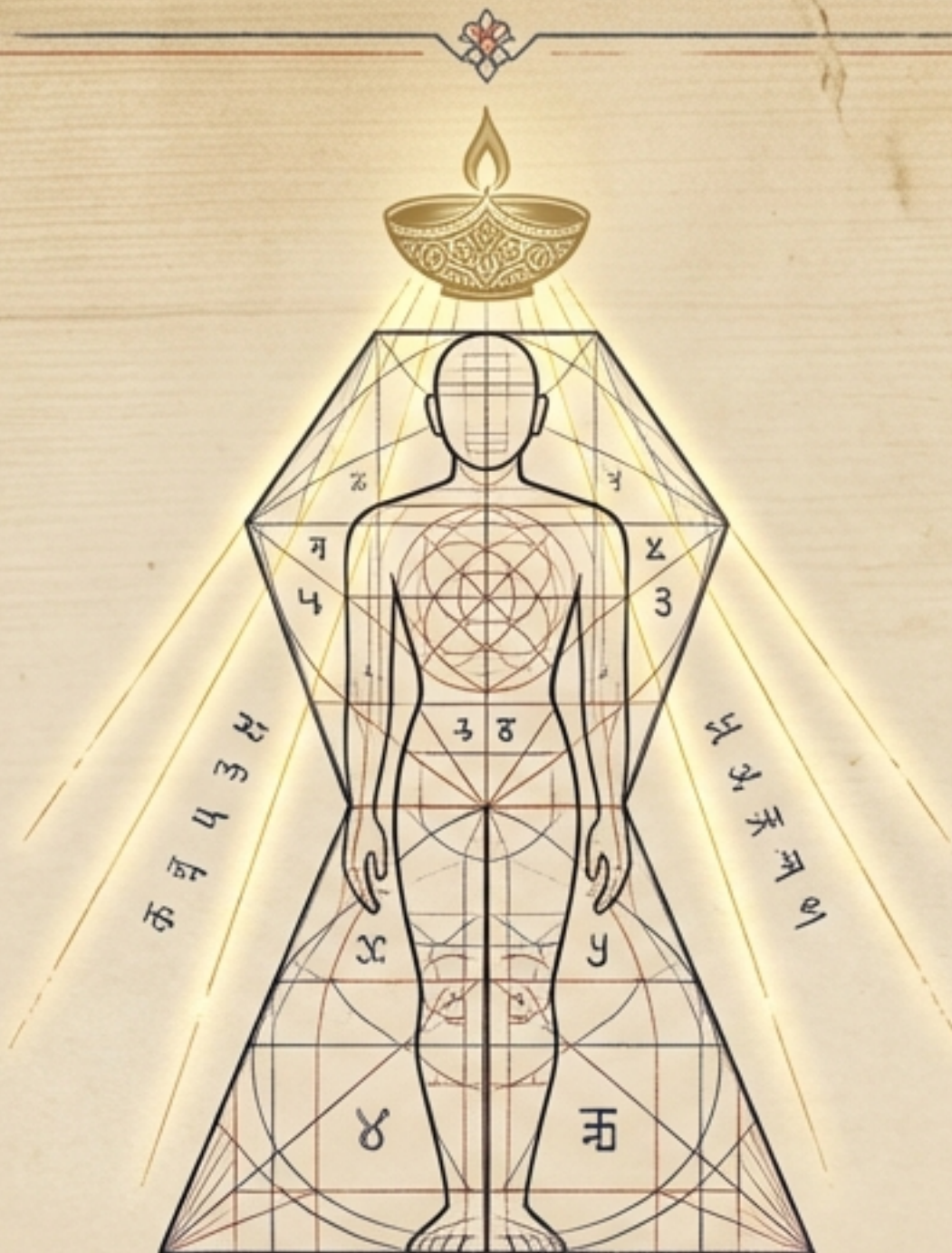
Mathematics in the Service of Religious Life: Insights from
Mahaviracharya's *Ganitasara-Sangraha* (c. 850 AD)



In the 9th-century court of the Rashtrakuta King Amoghavarsha, the Jain monk Mahaviracharya composed a treatise that redefined mathematics. While the West was centuries away from such organization, the *Ganitasara-Sangraha* presented calculation not as a secular utility, but as a 'lamp' illuminating the structure of the universe. For the devotee, to calculate was to understand the nature of the soul, the cosmos, and the divine.

The Eulogy to Math

Mahaviracharya opens his text with a tribute to numbers, explicitly linking them to religious duty. He argues that in *Vedic* (ritual), *Samayika* (religious/equanimous), and *Laukika* (worldly) affairs, calculation is the governing force.



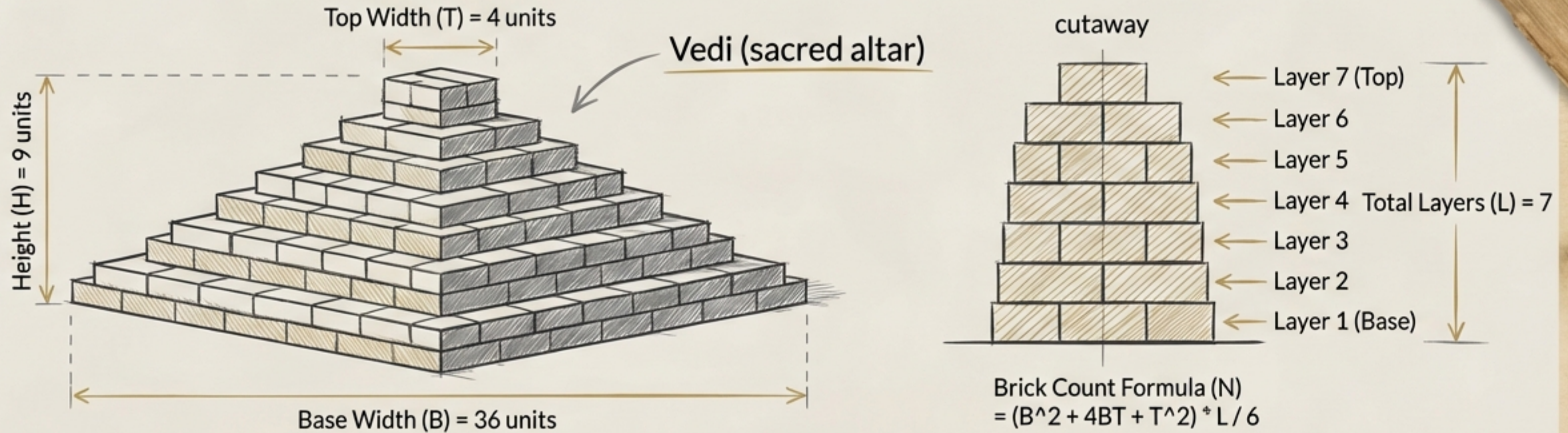
Universal Scope

The text asserts that everything—from the number of stars to the layout of heavens and hells (*Narakas*)—is unknowable without *Ganita* (Mathematics).

The Philosophy: The Lamp of the Three Worlds

“Whatever there is in all the three worlds, which are possessed of moving and non-moving beings—all that indeed cannot exist as apart from measurement.” — Mahaviracharya, Chapter 1

Sacred Architecture: Symmetry in Stone



The Altar Problem: Religious life centers on the construction of sacred spaces. Chapter 8 (*Khata-Vyavahara*) details specific rules for excavations and brick piles (*Chiti*).

The Mathematics: To build a stable pyramidal altar, a monk must calculate the total number of bricks based on the base layers. Mahaviracharya provides formulas to ensure the structure holds the physical weight and the spiritual sanctity of the ritual.

Context: The dimensions of the pyre and the altar are not arbitrary; they dictate the efficacy of the worship.

The Geometry of Worship: The Necklace Problem



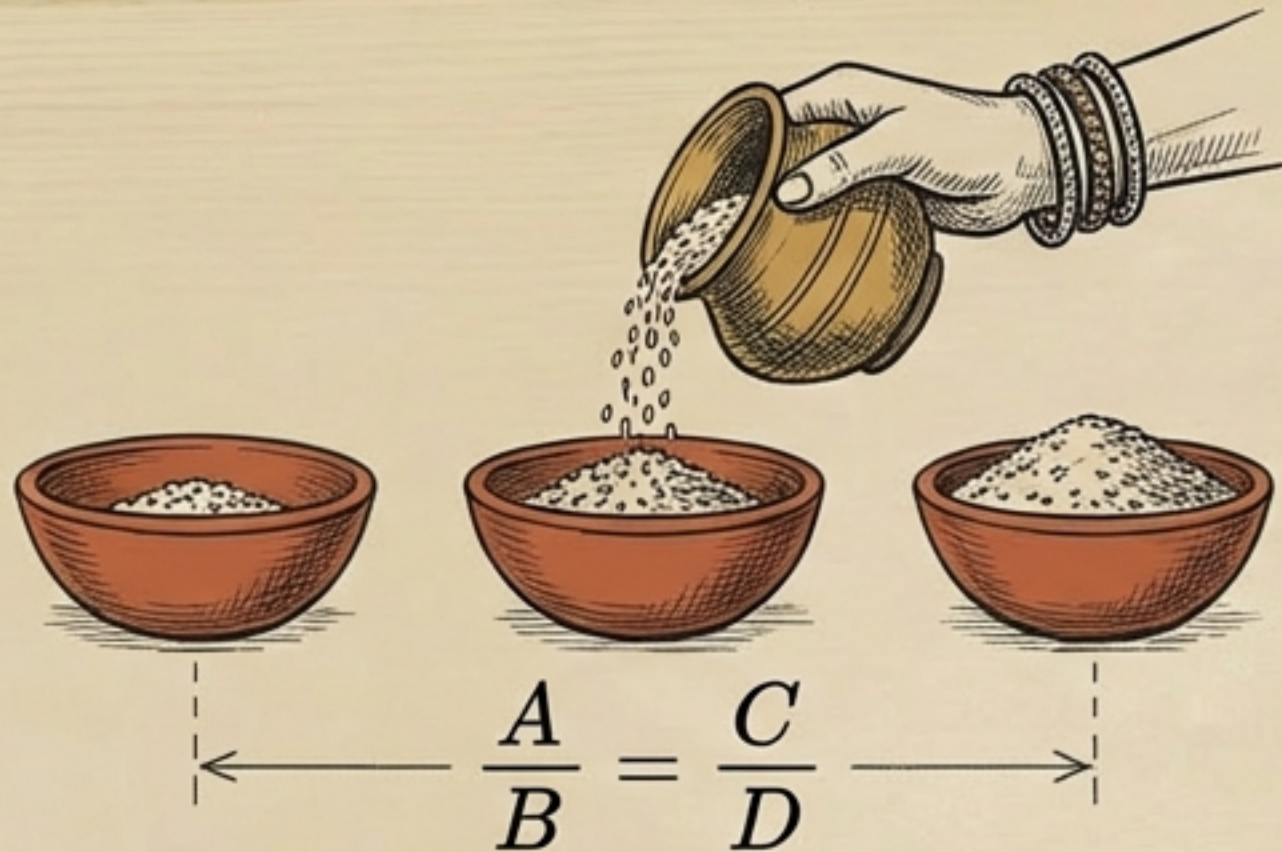
Aesthetics of Calculation:: Mahaviracharya uses problems involving garlands and pearls to teach arithmetic operations necessary for decorating statues of Tirthankaras.

$$\begin{array}{r} 11011011 \times 91 \\ \hline 1002002001 \end{array}$$

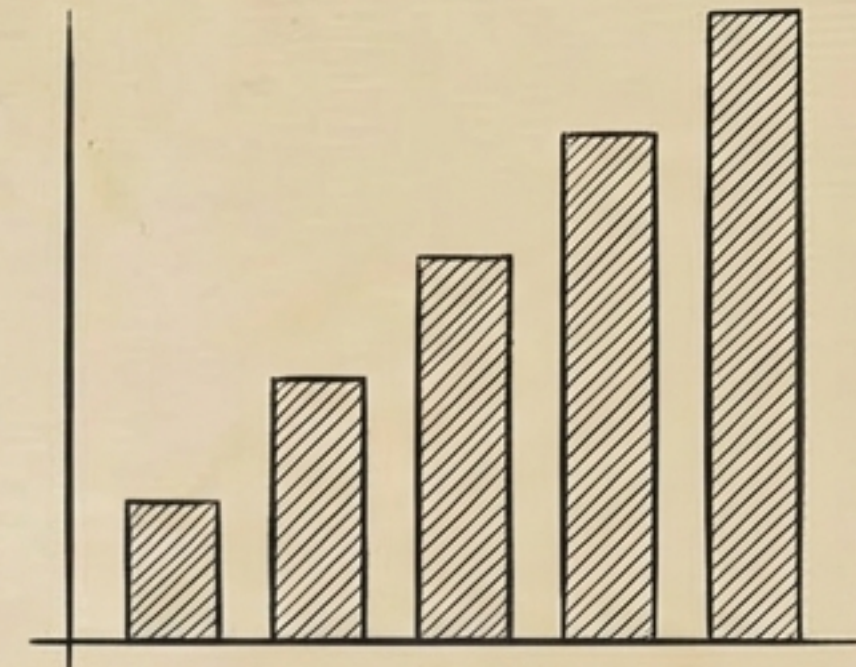
The Solution: By arranging digits in a specific symmetrical order (1 through 1) and multiplying by 91, the result is a palindromic number—a 'mathematical pearl necklace' that reflects the Jain love for perfect symmetry.

The Lotus Problem: The text also includes problems calculating fractional offerings of lotus flowers to different Jinendras, teaching the precise distribution of devotional items.

Almsgiving: The Calculus of Compassion



Rule of Three (Trairashika)



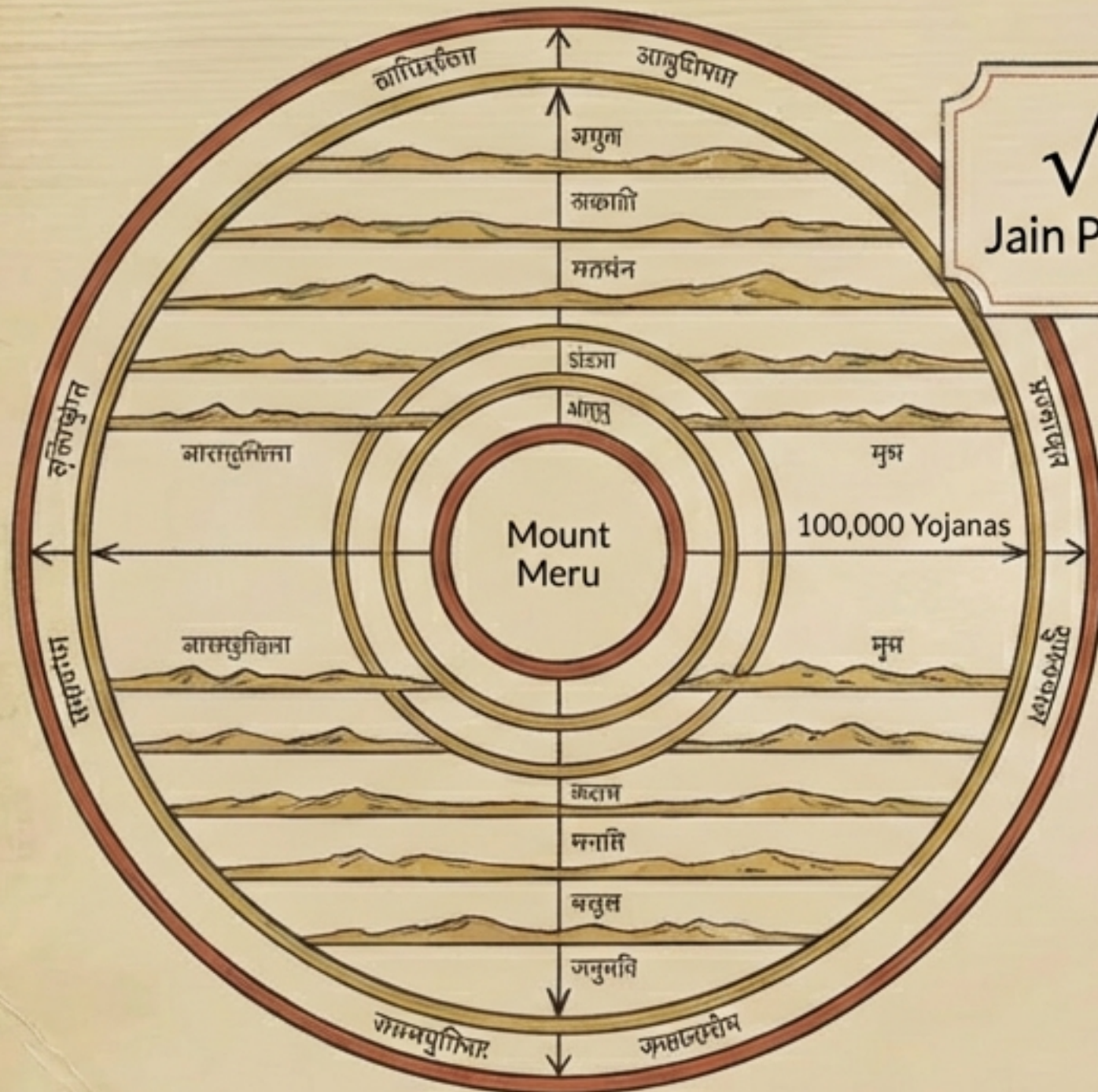
Arithmetic Progression

Fair Distribution: A core duty of the laity is *Dana*. The text deals extensively with the 'Rule of Three' (*Trairashika*) and complex fractions to manage the distribution of wealth, food, or silk among the *Sangha* (community).

Progressive Charity: Mahaviracharya presents problems where wealth is distributed in Arithmetic Progression—where each person receives a progressively larger or smaller share.

Ethical Math: For the merchant-class devotee, accuracy in these calculations was a matter of religious ethics, adhering strictly to vows of non-stealing and truth.

Mapping the Infinite: Jain Cosmology

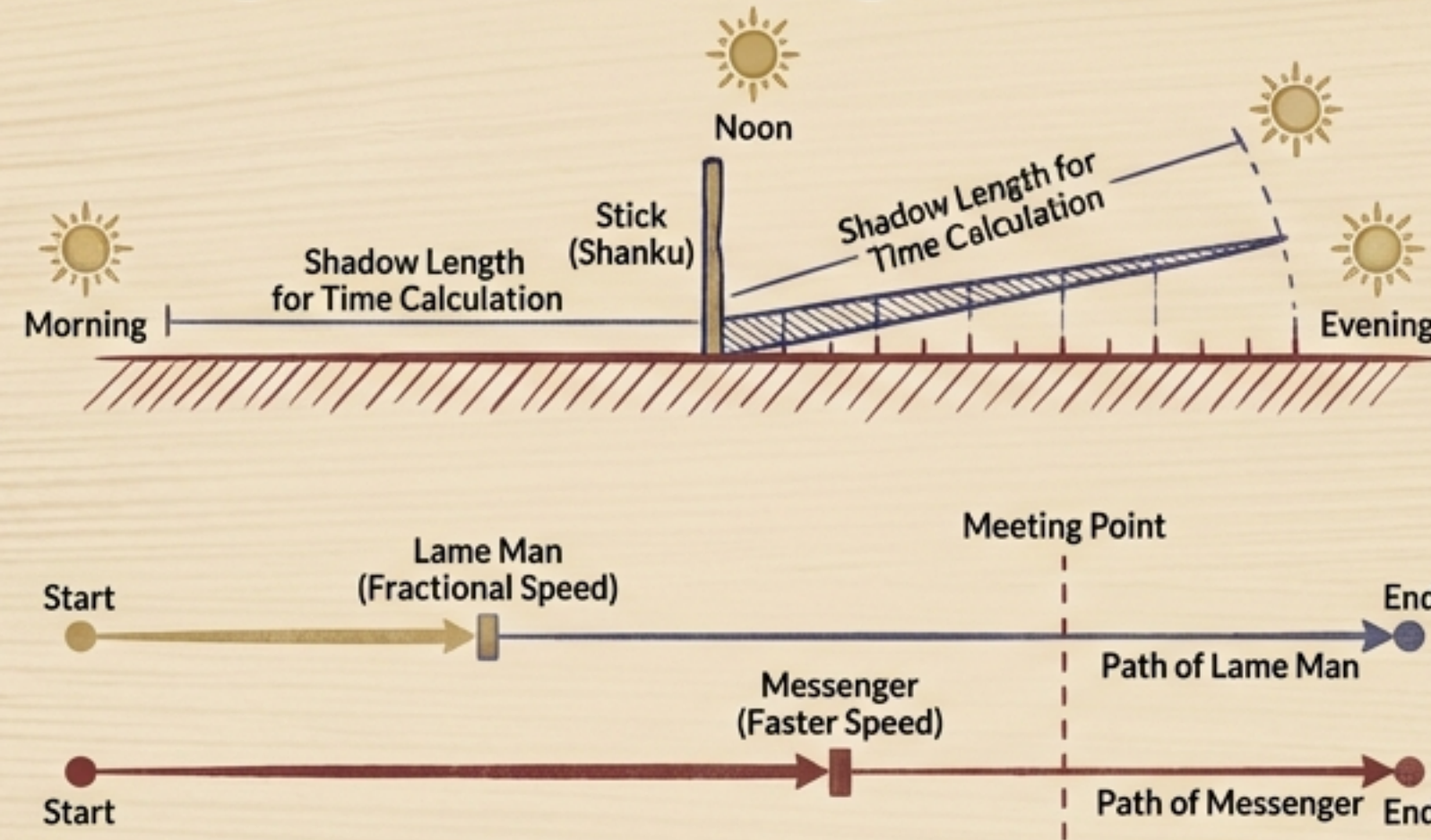


$$\sqrt{10}$$

Jain Pi ≈ 3.16

- **Cosmic Geography:** To a Jain monk, the universe is a physical reality with precise dimensions. Math is the only way to comprehend the scale of existence.
- **Jain Pi:** Uniquely, the text uses the square root of 10 (approx. 3.16) rather than the Archimedean value for Pi. This was the scriptural standard for calculating the circumference of the cosmic islands.
- **The Rajju:** The text utilizes the *Rajju* (rope) not just as a tool, but as a unit for measuring the vast, logarithmic distances between heavenly bodies and hellish realms.

Pilgrimage: The Logistics of Travel

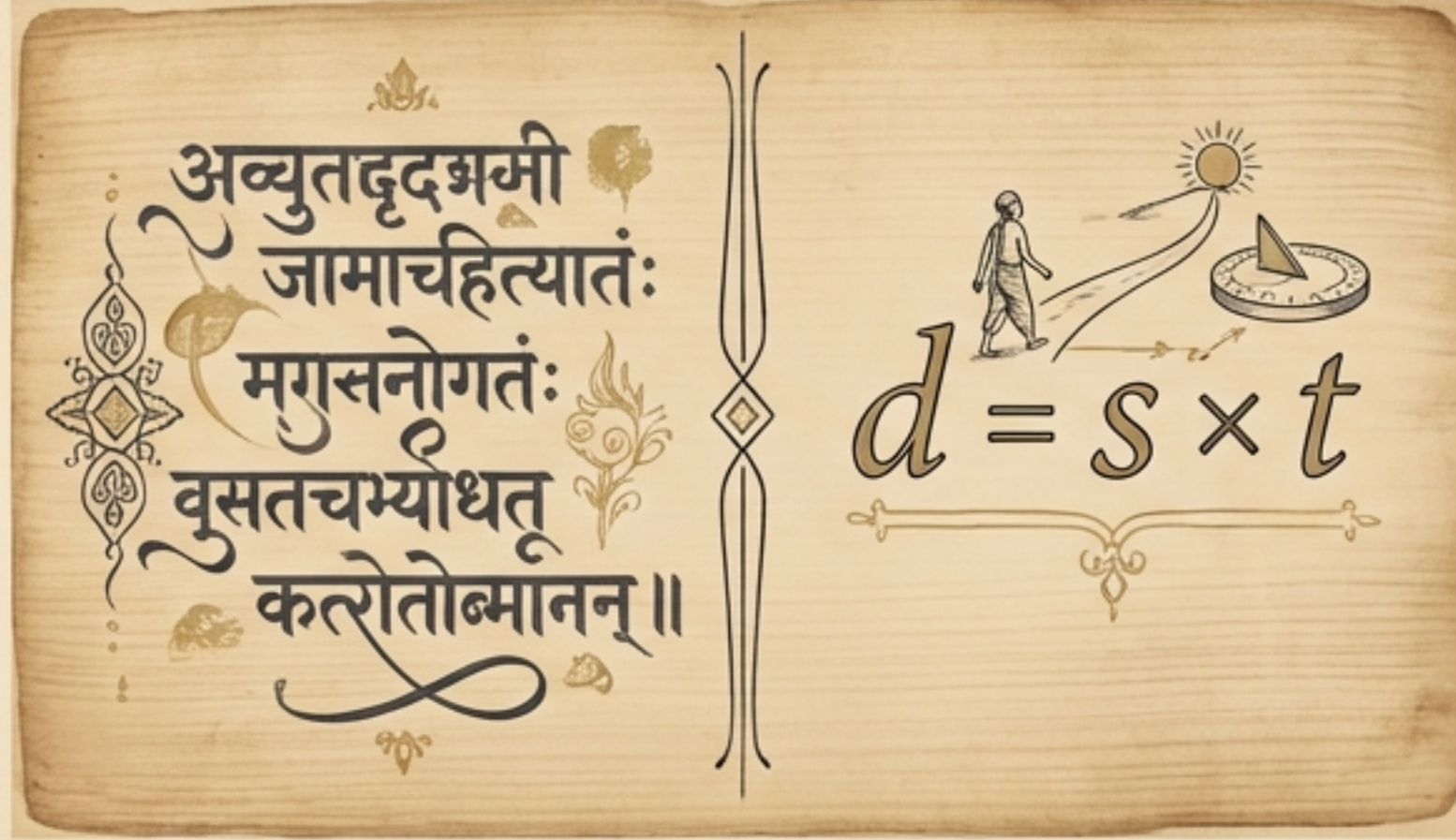


Shadow Reckoning: Chapter 9 (*Chaya-vyavahara*) focuses on shadow problems. A monk possessing no mechanical clock must use the length of a human shadow to calculate the precise time for prayer and fasting.

The Messenger Problems: The text includes “pursuit problems”—calculating when two travelers moving at different speeds will meet.

Practical Application: Example problems involve a “lame man” moving at a fractional speed versus a faster traveler. This math allowed pilgrimage leaders to plan meeting points and rest stops for groups with different physical capabilities.

Verse as Variable: Poetry as Pedagogy



- **Encoded Knowledge:** Mahaviracharya wrote the entire treatise in Sanskrit verse. The rhythm and meter aided memorization in an oral tradition.
- **Aesthetic Logic:** A 'beautiful' problem was one that flowed poetically. The text uses terms like 'O friend' and 'O learned one' to address the student, turning the study of numbers into a dialogue.
- **Symbolism:** Large numbers are often represented by symbolic words (e.g., 'Moon' for 1, 'Eyes' for 2, 'Fire' for 3), weaving religious symbolism directly into the hard data.

Conclusion: Calculation as Meditation



The Final Variable: In *Ganitasara-Sangraha*, the practical and the spiritual are fused. To calculate the depth of a moat or the stars in the sky is to perceive the infinite qualities of the *Tirthankaras*.

Closing Invocation: The text ends as it began, with a bow to the divine. For Mahaviracharya, **mathematics was the ultimate abstraction**—a path to detach from the material and understand the absolute truth of existence.

“I bow to Lord Mahavira... who by his knowledge of the science of numbers illuminates the three worlds.”